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VARIABILITY OF SOME APRICOT VARIETIES AND HYBRIDS PRODUCTIVITY TRAITS CREATED IN ROMANIA

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Abstract

*Current requirements of the species Prunus armeniaca in terms of creating new varieties require a conducted extensive research in the apricot breeding program in the south-eastern of Romania. It's been proceeded for early selections based on correlations in order to create new varieties with high productivity and organoleptic qualities. Characteristics and traits of the 36 varieties and hybrids of apricot studied, grouped according to the period of maturation, were studied starting with the IPGRI descriptors used in Genus Prunus. The characteristics were followed: trunk cross-sectional area (cm^2), fruit production (t/ha), the number of fruit tree branches unit length of thick branch and fruit branch type specific for apricot. The resulting correlations between fruit production (t/ha) and the number of fruit tree branches unit length of thick branch R^2=0,1084***. For series of data belonging to fruit production (t/ha) and number of fructification branches (spur branches, short branches, long branches and mixt branches) the correlation coefficient had a lowered value, between 0,0007 si 0,0524**. So, this resulted in a somewhat correlation between fruit production (t/ha) and number of spur branches to the unit length of thick branch R^2= 0524**.*

Key words: *apricot, varieties, productivity, fructification branches, correlations.*

INTRODUCTION

The creation of apricot varieties with different fruit maturation periods, especially extra early and late maturation (Bassi D. and Audergon J.M., 2006), has been a priority since 1980 to improve the program in Romania. The market had a demand for extra early apricots (Audergon J.M., 1995), until recently satisfied by importing them from the Mediterranean countries like Italy, France, Spain and Turkey is a strong argument for the scientists involved in the improvement of this species.

MATERIALS AND METHODS

The biological material is represented by 36 varieties and hybrids of apricot with different fruit maturation periods: very early (ve), early (e), middle (m) and late (l).

These were grouped according to the period of maturation and studied starting with the IPGRI descriptors used in Genus Prunus.

The characteristics were followed: trunk cross-sectional area (cm^2), fruit production (t/ha), the number of fruit tree branches unit length of thick branch and fruit branch type specific for apricot.

The trunk cross-sectional area was calculated after the formula TSA (cm^2) = D x d, in which D = diameter of the trunk on the rows direction and d = diameter of the trunk perpendicular on the row direction.

Characteristics of fructification type is a genetic particularity and it shows the predominating fructification of the varieties. 3 trees were marked from each variety and hybrid, choosing and marking the thick branch in which the dynamically numbered and measurements of the fructification branches (Cociu V. and Oprea St., 1989). They were counted and registered: number of fructification branches unit length of thick branch, number of spur branches unit length of thick branch, number of short branches unit length of thick branch, number of long branches unit length of thick branch and number of mixt branches unit length of thick branch.

Fruit production was calculated from the medium production, cross-referred to the density of 625 trees per hectare (4 x 4m).

For a more objective interpretation, the results were statistically processed using statistical software, obtaining the coefficient of variability analysis of variance to express the variability in the character analysis.

RESULTS AND DISCUSSIONS

Trunk cross-sectional area (cm^2)

The lower section of the trunk had the phenotypes: Andrei (m) with 180 cm^2, 82.12.2 BIV (e) and Valeria (ve) with 184 cm^2 and Rares (ve) with less than 190 cm^2. The most phenotypes with over 250 cm^2, resulted to be: Adina (l), Excelsior, Ilinca, Bucovina (m) and Favorit (l).
Significant differences were provided for a probability of error of up to 5% between maturation groups, with limits ranging from 189 cm^2 to 231 cm^2 (Figure 1). Variability to the index of section of the trunk has a high value, expressed by the variability coefficient of 55,92%.

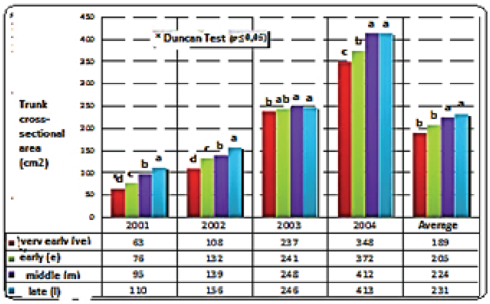

Figure 1. Phenotype influence on cross-sectional area of the trunk based on the year of study

The total number of fructification branches / linear meter of thick branch

The phenotype Ilinca (m) had the highest average number with 47 of fruiting branches. 45 of fruiting branches had the phenotypes: Viorica (e), Nicusor (m) and Excelsior (m). With 44 of fruiting branches presented the phenotypes: Adina (l), Favorit (l) and Carmela (e) each with 43 of fruiting branches and Dacia (e) with 40 of fruiting branches. The coefficient of variability of the total number of fructification branches/linear meter of thick branch, expressed a medium-high value by the coefficient of 21.81%.

Number of spur branches / linear meter of thick branch

The phenotypes with the bigest number of spur branches were: Nicusor (m) – 27 branches, Valeria (ve), Viorica, Carmela (e) with 26 branches, Dacia (e) and Rares (ve) with 25 branches, Ilinca (m) – 24 branches, Alexandru and Andrei (m) each with 21.
The variability of number spur branches /linear meter of thick branch has a high value expressed by the coefficient of 71,57%.

Number of short branches /linear meter of thick branch

The phenotype 85.2.89 BIII (m) had the most short branches number/linear meter of thick branch (over 22), followed by the phenotypes: Adina (l), 85.4.108 BIII (m), 85.3.100 BIII (m), 82.28.62 BIV (m) and 82.12.7 BIV (l), with medium between 15-20 short branches /linear meter of thick branch. The variability of the number of short branches/linear meter of thick branch had a high value, expressed by the coefficient of 52,61%.

Number of mixed branches /linear meter of thick branch

The phenotypes with the most mixed branches number were: 82.16.7 BIV (l) with 26 mixed branches/linear meter of thick branch, Excelsior (m), 82.15.48 BIV (l), 82.32.9 BIV, 82.7.65 BIV,
Ilinca (m) and 82.4.41 BIV (l) between 20 and 25 mixed branches/linear meter of thick branch. Groups of very early phenotypes do not bear fruit on the mixed branches.
Significant differences were provided between the late maturation group (15 branches), the medium (10) and the early (2 branches) (Figure 2). The variability of the number of mixed branches /linear meter of thick branch has a high value, expressed by the coefficient of 102,05%.

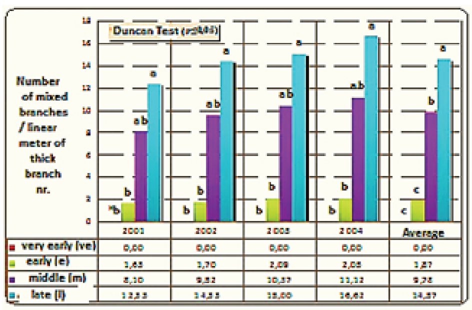

Figure 2. Influence of maturation class of fruits on on the number of medium branches / linear meter of thick branch based of the year of study

Number of long branches /linear meter of thick branch

The phenotypes with highest number of long branches number with medium maturation were: 85.18.5BIII, 85.1.96 BIII – Nicusor, 85.4.108 BIII, 85.4.95 BIII, Excelsior Mt., 85.2.89 BIII and the phenotype with early (e) maturation Carmela. The variability of number long branches /linear meter of thick branch has a high value, expressed by the coefficient of 59,66%.

Fruit production (t/ha)

The most productive phenotypes were: Dacia, Viorica (e), followed by Excelsior (m), Adina (l), Carmela (e), Nicusor, Siret, Ilinca, Favorit, Bucovina, the differences were not statistically assured. Variability in fruit production (t/ha) had a high value, expressed by the coefficient of variability of 72,96%.

Correlations between fruit production (t/ha) and its components

On the 36 phenotypes a series of correlations were made between fruit production (t/ha) and its components referring on the number of the fructification branch / linear meter of branch and the type of fructification branches with direct implication on fruit production. First correlation is showed between fruit production (t/ha) and the number of fructification branches per unit length of thick branch, by the existence of a high coefficient of correlation 0,1084 (Figure 3).

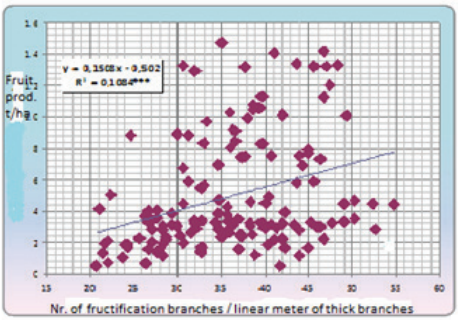

Figure 3. Intensity correlation between fruit production and the number of fruit tree branches unit length of thick branch

A strong correlation was observed between fruit production (t/ha) and tree trunk cross-sectional area which is based on determining a high correlation coefficient of 0,7748 (Figure 4).

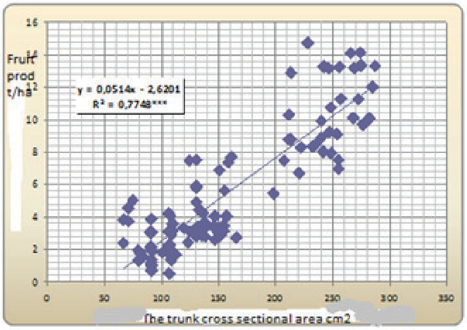

Figure 4. Intensity correlation between fruit production and tree trunk cross sectional area

The correlation of coefficient calculated between the number of fructification branches and number of spur branches was 0,2379 (Figure 5), between the number of fructification branches and number of long branches 0,1072 (Figure 6), between the number of fructification branches and number of short branches 0,0623 (Figure 7) showing a high correlation, while the correlation coefficient obtained between the number of fructification branches and number of mixed branches had a smaller value of 0,0117 (Figure 8), which indicate a reducted degree of correlation.

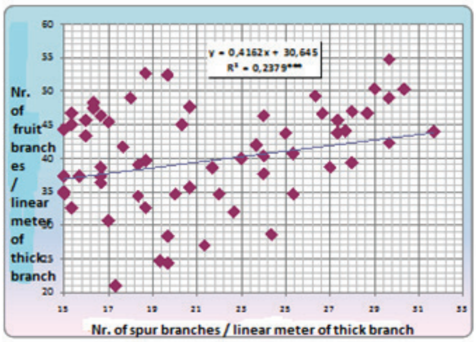

Figure 5. Intensity correlation between the number of branches of fruit and number of may branches to the unit length of thick branch

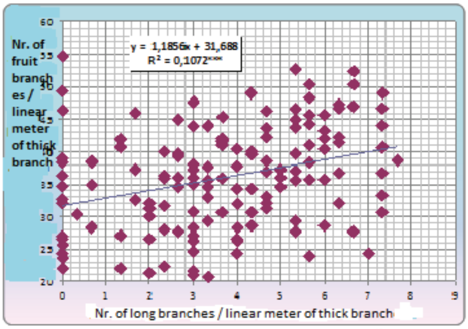

Figure 6. Intensity correlation between the number of fructification branches and number of long branches to the unit length of thick branch

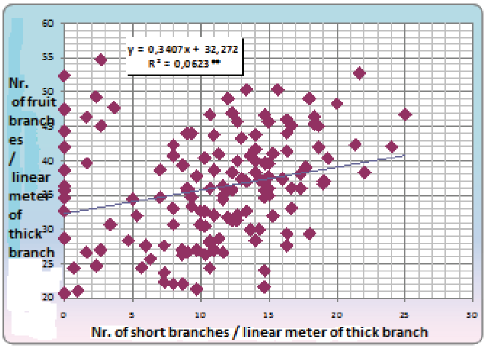

Figure 7. Intensity correlation between the number of branches of fruit and number of short branches to the unit length of thick branch

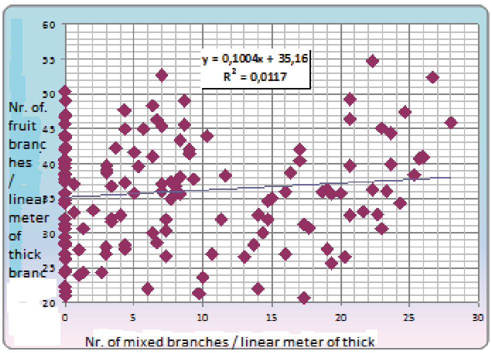

Figure 8. Intensity correlation between the number of branches of fruit and number of mixt branches to the unit length of thick branch

Correlation between trunk cross-sectional area and the number fruiting branches

Direct relationship between trunk cross-sectional area and the number of fructification branches/linear meter of thick branch is highlighted by a correlation coefficient of 0,466 (Figure 9), but with other types of fruit branches, the correlation is different.

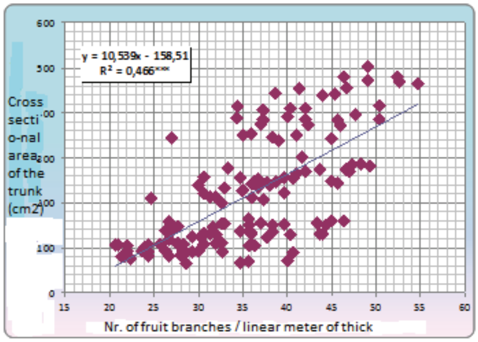

Figure 9. Intensity correlation between cross-sectional area of the trunk and the number of fruit branches to the unit length of thick branch

CONCLUSIONS

These significant correlations were found between:

- fruit production (t/ha) and number fruiting branches/linear meter of thick branch R^2 = 0,1084***.

- fruit production (t/ha) and tree trunk cross-sectional area R^2 = 0,7748***.

- the number of fruit branches and the number of spur branches R^2 = 0,2879***.

- the number of fruit branches and the number of long branches R^2 = 0,1072 ***.

- trunk cross-sectional area and the number fruiting branches / linear meter of thick branch R^2 = 0,466 ***.

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